WE CLAIM:

1. A system for managing a network comprising:

a first network element;

a second network element connected to said first network element;

a network management system connected to said first and second network elements; and

wherein said first and second network elements each include means for encoding a unique identifier associated with each of said network elements, a processor coupled to said encoding means, and means for physical layer auto-discovery.

2. The system in accordance with claim 1 wherein said means for physical layer auto-discovery comprises:

a program storage device readable by a processor and tangibly embodying a program of instructions executable by the processor to perform a method of communicating connectivity information between said first and second network elements, the method comprising the steps:

sending a request packet at the physical layer from the first network element to the second network element; and

receiving a respond packet at the physical layer in response to said sent request packet.

3. The system in accordance with claim 2 wherein said request packet comprises a first packet protocol identifier, a sequence number, and a padding.

4. The system in accordance with claim 2 wherein said response packet comprises a second packet protocol identifier, said sequence number, a far end electronic serial number, a far end port identifier, and a padding.

5. The system of claim 1 wherein said first network element is connected to said second network element by an optical fiber link.

6. A method for automatically discovering a network topology comprising the steps of:

assigning an electronic serial number and unique port identifier to a network element;

representing the network element in a network management system based on said assigned electronic number;

communicating connectivity information between the network element and a neighboring network element based on said assigned electronic serial number and unique port identifier; and

communicating said connectivity information to the network management system so that the connectivity information is associated with said representation of the network element.

7. The method in accordance with claim 6 wherein said step of assigning an electronic serial number comprises the steps of assigning a network element model number and a network element serial number.

8. The method in accordance with claim 6 wherein said step of representing the network element in a network management system comprises the step of assigning a CORBA object to the network element and associating the CORBA object with said assigned electronic serial number.

9. A network element comprising means for encoding an electronic serial number associated with each the network element, a processor coupled to said

encoding means, and means for physical layer auto-discovery coupled to said processor and wherein said processor uses the encoded electronic serial number and the autodiscovery means to discover all other network elements linked to the network element.

10. A request packet for use in a physical layer auto-discovery protocol comprising a packet protocol identifier, a sequence number, and padding.

11. A response packet for use in a physical layer auto-discovery protocol comprising a packet protocol identifier, a sequence number, a far end electronic serial number, a far end port identifier, and padding.